



(11) Publication number : **0 589 830 A2**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **93810607.7**

(51) Int. Cl.<sup>5</sup> : **D03D 51/00, D03J 1/00**

(22) Date of filing : **25.08.93**

(30) Priority : **01.09.92 JP 233576/92**

(43) Date of publication of application :  
**30.03.94 Bulletin 94/13**

(84) Designated Contracting States :  
**BE DE FR IT**

(71) Applicant : **Kabushiki Kaisha Toyota Jidoshokki Seisakusho**  
**1, Toyoda-cho 2-chome, Kariya-shi**  
**Aichi-ken (JP)**

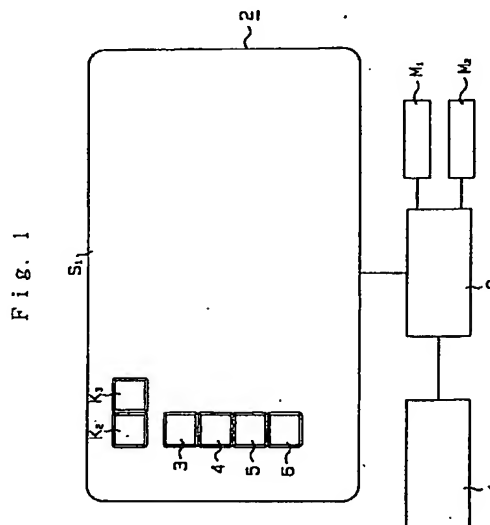
(72) Inventor : **Okuda, Taijiro, c/o Kabushiki Kaisha Toyota Jidoshokki Seisakusho, 1, Toyoda-cho 2-chome Kariya-shi, Aichi-ken (JP)**  
Inventor : **Arakawa, Akio, c/o Kabushiki Kaisha Toyota Jidoshokki Seisakusho, 1, Toyoda-cho 2-chome Kariya-shi, Aichi-ken (JP)**  
Inventor : **Tanzaki, Hiroshi, c/o Kabushiki Kaisha Toyota Jidoshokki Seisakusho, 1, Toyoda-cho 2-chome Kariya-shi, Aichi-ken (JP)**

(74) Representative : **Hammer, Bruno, Dr. c/o Sulzer Management AG KS/Patente/0007 CH-8401 Winterthur (CH)**

(54) Display device in a loom.

(57) Object of the invention is to improve the utilization of a display device used in weaving operation.

There is provided a loom control computer (C) to which a data input device (1) and a display unit (2) are connected. With power applied to the display unit (2), it shows an initial mode screen (S1) providing information for the fixer. With the selection key switch (K2) touched by a probe, the screen is changed to an initial mode screen for the weaver; with the selection key (K3) touched, the screen is switched to still another initial mode screen for the manager. Each information screen on effected by key touching provides necessary data and information for the fixer, weaver and manager, respectively.



EP 0 589 830 A2

## DETAILED DESCRIPTION OF THE INVENTION

## INDUSTRIAL FIELD OF UTILIZATION

5 The present invention relates to a display device for use in a weaving loom.

## PRIOR ART

10 It is a normal practice in a weaving mill that personnel, including weaver (or workman), fixer (or maintenance staff member) and manager, are engaged in different assigned jobs, respectively, in weaving operation. Namely, the weaver performs the job of installing a warp beam in a loom, removing a cloth roll therefrom, etc., the fixer performs initial setting-up adjustments for each of the looms and takes necessary steps against possible troubles associated with weaving operation of the loom, etc., and the manager oversees and controls the overall weaving conditions of the looms.

15 Publication of Unexamined Japanese Utility Model Application 64-45185 (1989) discloses a weaving loom equipped with a display device which is used to be referred to in data inputting and shows relevant information as required. The above personnel share this display device in common and make use of it when inputting necessary data and to obtain necessary setting data and information about various weaving conditions of the loom from the screen of the display device.

20

## PROBLEMS THAT THE INVENTION IS TO SOLVE

25 According to the above prior art device, however, information is displayed in a manner classified according to the respective functions or mechanisms of the loom, such as weft insertion, weft detection, warp letting-off, etc., and the information for each such function appear at one time on a single screen of the display unit. Therefore, it is hard and troublesome for each one of the personnel to have a quick access to the right screen and to find the right information that they actually require. Accordingly, it takes time before they can take an appropriate action after reading the information on the screen, thus affecting the overall efficiency of weaving operation.

30 Therefore, it is an object of the present invention to provide a display device for use in a weaving loom which can be operated and utilized easily by each one of the weaving personnel without causing them to be confused in selecting the screen and reading their necessary information.

## MEANS SOLVING THE PROBLEMS

35

The above object can be accomplished by a display device in a loom which comprises memory means for storing therein weaving data of the loom, selection means for selecting from said memory means data corresponding to the job of each one of the personnel engaged in weaving operation, control means for reading said corresponding data from said memory means according to the selection by said selection means, and display means for displaying information based on the data transmitted by said control means.

40

## OPERATION OF THE INVENTION

45 When any one of the weaving personnel operates the selection means, the control means reads from the memory means data corresponding to the above operation of the selection means. The data thus read by the control means is transmitted to the display means, which then displays information based on the transmitted data. Because unnecessary and hence irrelevant information will not be shown on the screen of the display means, the weaving personnel can obtain the right information quickly without being confused by superfluous information displayed in the prior art device.

50

## EMBODIMENT

The following will describe an embodiment of display device according to the invention as applied to a jet loom, while having reference to FIGS. 1 -4.

55

- FIG. 1 is a schematic view showing fixer's initial display mode screen.
- FIG. 2 is a schematic view showing a screen displayed by actuating a sub key.
- FIG. 3 is a schematic view showing weaver's initial display mode screen.
- FIG. 4 is a schematic view showing manager's initial display mode screen.

In the drawings, reference symbol C designates a control computer for controlling the respective drive systems of the loom according to a loom control program stored in a program memory M1 and also to weaving data inputted through an input device 1 and stored in a data memory M2. Pi display unit 2 is connected to the control computer C.

5 The program memory M1 has also stored therein a display control program. This program, when executed, causes an appropriate initial mode screen, corresponding to any one of selection keys K1, K2 and K3 which will be described hereinafter, to appear on the display unit 2. Incidentally, these keys K1, K2 and K3 correspond to fixer, weaver and manager, respectively. That is, initial mode screen intended for each one of the personnel can be selected by the selection keys K1, K2, K3.

10 When power is applied to the display unit 2, it displays an initial mode screen which was effective just before the power was turned off last. The initial mode screen includes first initial mode screen S1 for the fixer (FIG. 1), second initial mode screen S2 for the weaver (FIG. 3), and third initial mode screen S3 for the manager (FIG. 4).

15 The initial mode screen S1 shows a plurality of main keys 3, 4, 5, 6 on the left-hand side of the screen, and two selection keys K2, K3 at the left upper corner. The display unit 2 is of a so-called touch panel type. That is, each key appearing on the screen is actuatable by touching the key with a touch probe.

The main key 3 on the initial mode screen S1 is actuated to display a plurality of sub keys used for checking the operating conditions of various drive mechanisms of the loom. With main key 3 touched by a probe, sub keys 7, 8, 9, 10 appear at the bottom on the screen S1 as shown in FIG. 2. The sub key 7, for example, corresponds to air injection mechanism, and when it is touched by the probe, manual check keys 11A, 11B, 12A, 12B, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 appear on the screen S1, as shown in FIG. 2.

20 The check keys 11A, 11B are used for checking whether or not the solenoid valves for controlling air supply to main nozzles for two-color weft insertion operate normally. If the solenoid valves operate normally, the keys 11A, 11B flicker when touched by the probe. The check keys 12A, 12B are used for checking the operation of solenoid valves for controlling air supply to the main nozzles for holding free leading end portion of wefts in the main nozzles. If these solenoid valves operate normally, the keys 12A, 12B flicker when touched by the probe. The other check keys 13 - 22 are used for checking the operation of the solenoid valves for controlling air supply to auxiliary nozzles. If the solenoid valves for the auxiliary nozzles operate normally, each of the keys 13 - 22 flickers when touched by the probe.

30 The sub keys 8, 9 and 10 are intended for checking the operation of lubricating oil supply device, warp tension adjusting device and device for removing a faulty weft caused by a failure in weft insertion, respectively. When any one of the sub keys 8 - 10 is touched by the probe, its associated manual check keys appear on the same screen.

35 The main key 4 is actuated to display sub keys used for initial setting-up adjustments of time at which a stop pin of winding type weft measurement and storage device is operated to engage with its associated weft winding surface of the device, time at which the stop pin is disengaged from the surface to release the measured and stored winding of weft, and times at which the solenoid valves for the main and auxiliary nozzles are energized and de-energized, respectively. When the main key 4 is touched by the probe, an array of sub keys for such time settings appear on the screen, and an appropriate setting-up screen appears by touching any one of the sub key with the probe.

The main key 5 is used to display information about loom operating conditions required by the fixer, and the main key 6 for transmission of data by use of an external data storage means such as card.

45 The above checking, setting-up adjustment and data transmission are jobs that should be performed by the fixer and, therefore, the sub keys on the initial mode screen si in FIG. 1 and information shown on the subsequent screens effected by key touching are provided specifically for the fixer. Thus, no other irrelevant keys, data and information will be shown on the screen. Apparently, this can help the fixer to recognize his required information quickly, so that he can take proper steps, accordingly, in performing his job.

50 Touching the key K2 with the probe on the screen S1 in FIG. 1 or 2 causes the screen to be changed to the initial mode screen S2 for the weaver, as shown in FIG. 3. This screen S2 has a plurality of main keys 23, 24, 25, 26, 27, 28 having a similar function as the main keys 3 - 6 on the fixer's initial mode screen S1. With any one of these main keys 23 - 28 touched by the probe, an appropriate weaver's screen appears on the display unit 2. Weaver's information screens effected by these main Keys 23 - 28 provide him with data and information about, e.g., warp tension, warp beam setting, removal of cloth roll, and faulty weft removal, etc. That is, touching the selection key K2 provides information screens intended for the weaver only, thus helping him to obtain necessary information quickly and to take an appropriate step, accordingly, in performing his job. As shown in FIG. 3, selection keys K3 and K1 are shown on the screen S2. If the key K3 is touched by the probe on this screen, the screen S2 is changed to the initial mode screen S3 for the manager, as shown in FIG. 4. This screen S3 has an array of main keys 29, 30, 31, 32 having a similar function as the main keys

3 - 6 on the fixer's initial mode screen S1. By touching any one of these main keys 29 - 32, an appropriate manager's screen appears on the display unit 2. Manager's screens effected by these main keys 23 - 28 provide him with data and information that he requires, e.g., woven cloth lengths, loom availabilities, working conditions of each loom for each time period of a day. That is, touching the selection key K3 provides information  
5 screens showing information for the manager only, thus permitting him to obtain necessary information quickly.

Because each screen has selection keys for the personnel other than the currently effective selection key as shown in FIGS. 1 - 4, it helps each one of the personnel to recognize the current screen and, if necessary, to change the screen to obtain data and information that he then requires.

It is to be understood that the present invention can be practiced in other ways and modifications without departing the spirit of the invention. For example, the display unit 2 of touch panel type may be substituted  
10 with a unit using movable push keys.

Object of the invention is to improve the utilization of a display device used in weaving operation. There is provided a loom control computer C to which a data input device 1 and a display unit 2 are connected. With power applied to the display unit 2, it shows an initial mode screen S1 providing information for the fixer. With  
15 the selection key switch K2 touched by a probe, the screen is changed to an initial mode screen for the weaver; with the selection key K3 touched, the screen is switched to still another initial mode screen for the manager. Each information screen on effected by key touching provides necessary data and information for the fixer, weaver and manager, respectively.

The number of initial mode screens may be changed as required depending on the number of different  
20 kinds of jobs to be performed by the weaving personnel. For example, there may be provided only two initial mode screens, in which the manager and the fixer may share a single initial mode screen in common. Alternatively, the job of each one of the personnel may be further divided into a plurality of groups and the number of the initial mode screens increased accordingly.

## 25 EFFECT OF THE INVENTION

As it is apparent from the foregoing, the display device according to the invention can permit the personnel engaged in weaving operation to obtain their necessary data and information without being confused by unnecessary and irrelevant information on the screen, thereby improving the overall efficiency of the weaving  
30 operation.

## [DESIGNATION OF REFERENCE NUMERALS]

2... Display unit as display means; S1, S2, S3 ... Initial display mode screens; K1, K2, K3 ... Selection keys  
35 as selection means; M2 ... Data memory as memory means, C ... Loom control computer as control means.

## Claims

- 40 1. A display device in a loom comprising,  
memory means for storing therein weaving data of the loom,  
selection means (K1, K2, K3) for selecting from said memory means data corresponding to the job  
of each one of the personnel engaged in weaving operation,  
control means (C) for reading said corresponding data from said memory means (M1, M2) accord-  
45 ing to the selection by said selection means K1, K2, K3,) and  
display means (2) for displaying information based on the data transmitted by said control means  
(C).
2. A display device as claimed in claim 1, further including sub keys (7, 8, 9, 10) for selecting data related  
50 to drive mechanisms of the loom, said sub keys being displayed after having selected data corresponding  
to a particular job.
3. Display device as claimed in claim 1 or claim 2, further including check keys (11A, 11B, 12A, 12B, 13, 14,  
15, 16, 17, 18, 19, 20, 21, 22) for checking the performance of drive mechanisms, in particular weft in-  
55 sertion drive mechanisms of the loom.
4. Display device as claimed in claim 3, the weft insertion drive mechanisms being the air injection mech-  
anism controlling air supply to main nozzles and/or auxiliary nozzles of a jet loom.

5. Display device as claimed in any of claims 2 to 4, with sub keys (8, 9, 10) for checking and giving information regarding lubricating oil supply device, and/or warp tension adjusting device and/or faulty weft insertion removing device and/or a weft storing device and/or warp beam setting and/or removal of cloth roll.

5

6. Display device as claimed in any of claims 1 to 5 with each a selection key for fixer, weaver and/or mill manager.

7. Display device as claimed in any of claims 1 to 6, with a touch panel type display device (S1) for displaying keys and information.

10

8. Loom with a display device according to any of claims 1 to 7.

9. Air jet loom with a display device according to any of claims 1 to 7.

15

20

25

30

35

40

45

50

55

Fig. 1

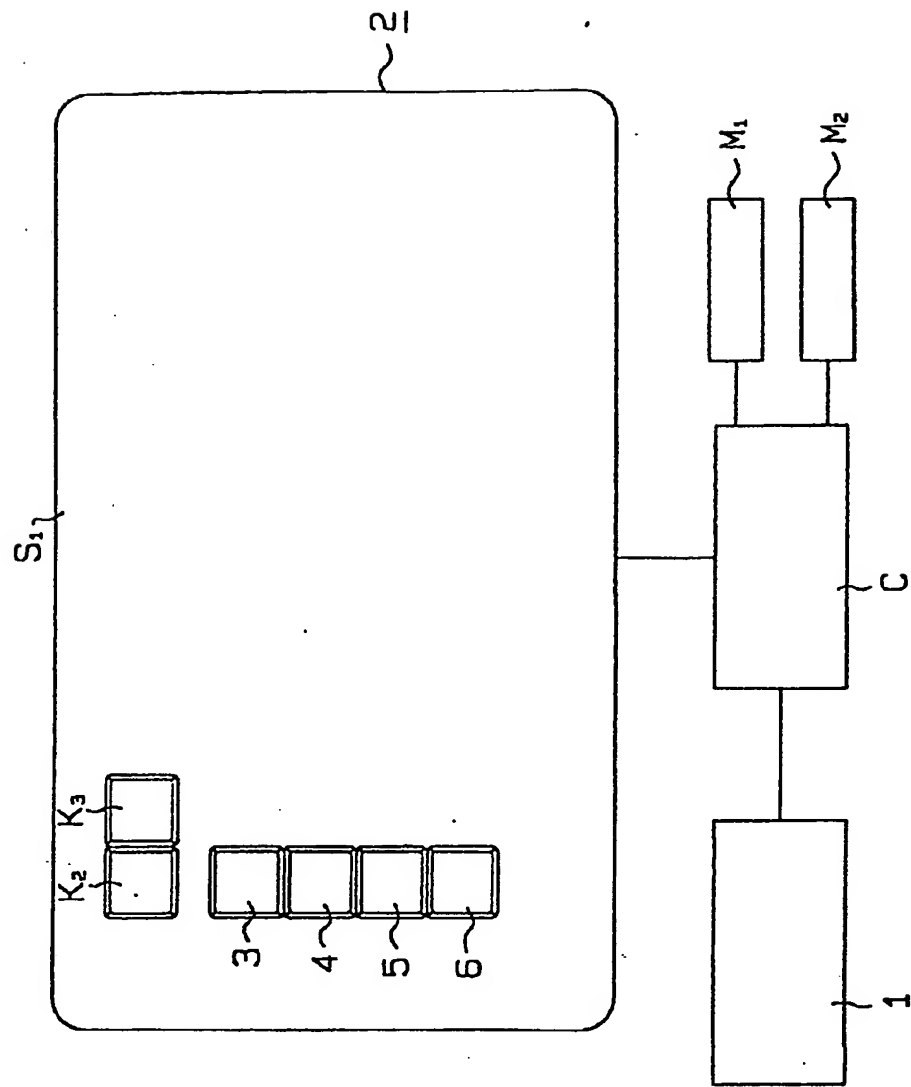


Fig. 2

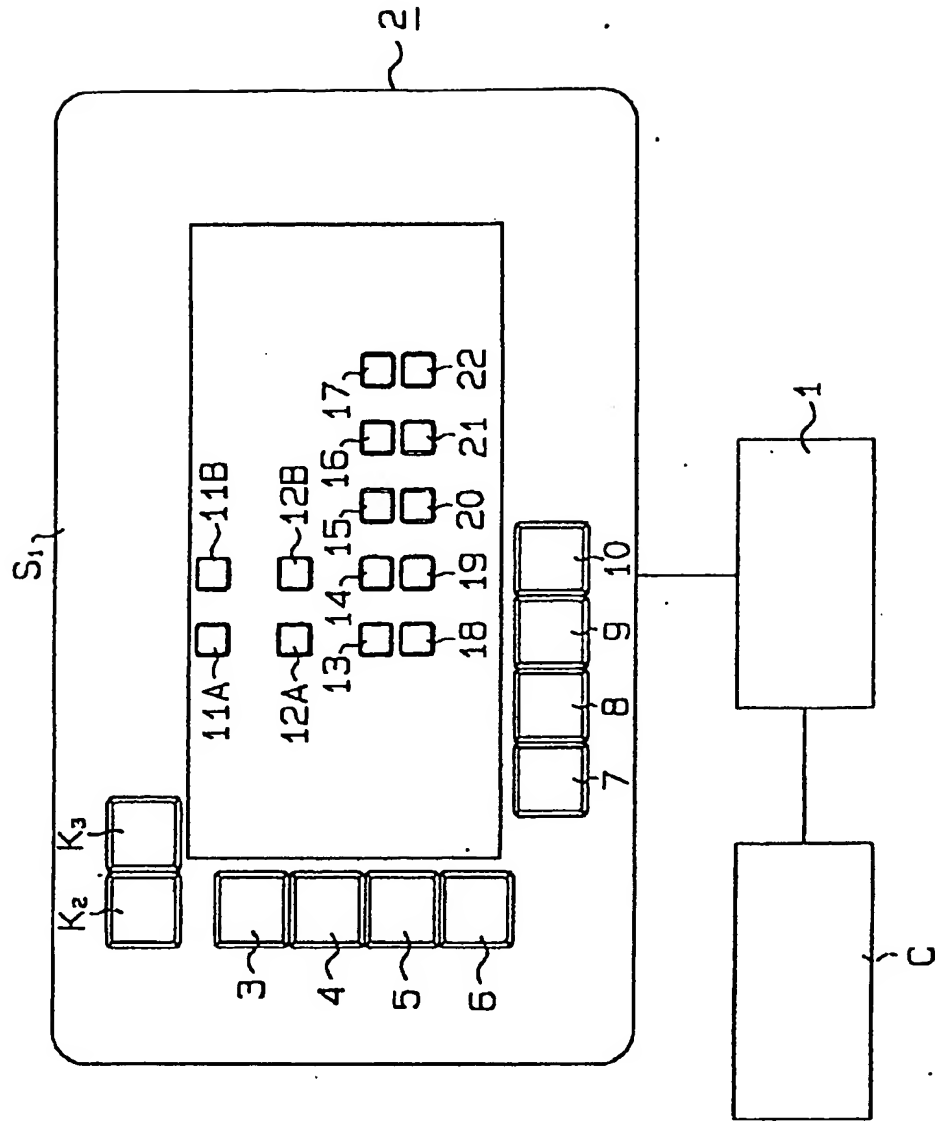


Fig. 3

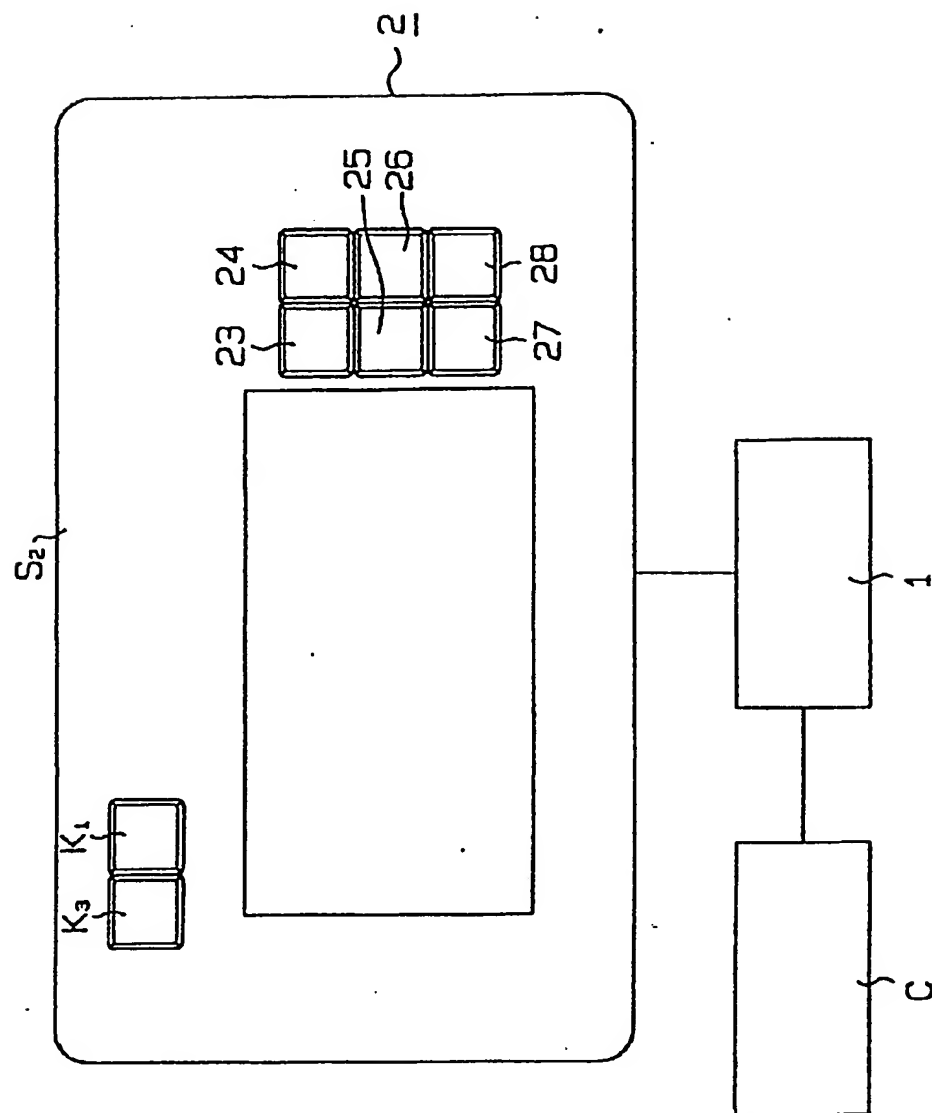




Fig. 4

